

THURSDAY, DECEMBER 25, 1902.

AGRICULTURAL SCIENCE IN ITALY.

Chimica Agraria, Campestre e Silvano. Di Italo Giglioli. Pp. xviii + 877; with 31 figures in the text. (Naples: Marghieri, 1902.)

THIS book, the work of the well-known professor of agricultural chemistry in the College at Portici, was originally projected as a treatise on agricultural chemistry, to be followed by other volumes dealing with fermentation and animal chemistry. Written, as the author tells us, with many interruptions, between 1884 and the current year, it remains but a fragment of the original scheme, for it deals only with the relations of the plant to water and to solar light and heat—questions, indeed, of fundamental importance to the agriculture of a semi-arid country like Italy. With nearly 900 pages devoted to so small a section of the subject, it will easily be imagined how vast is the scale upon which the work was planned, and this arouses a question which struck us repeatedly during the perusal of the book. Given a treatise on a technical branch of science, like agricultural chemistry, how far should the author deem it his duty to enter into a complete discussion of whatever branch of the pure science he may require to use for the explanation of some technical problem? For example, we have in the book before us some ten pages, 628–638, given up to an account of the nature of exothermic and endothermic chemical reactions. Now, though it is impossible to understand the problems presented by carbon assimilation under the action of light without possessing the conception of the transfer of energy accompanying a reaction and the reversibility of the change, we hold that the reader of a book like the present will have either reached already the required knowledge of pure chemistry or else must be introduced to the new idea in a much less academic fashion. In the main, a book of this type is written for the expert and should stick very close to its text, taking something more than the elements of the pure sciences for granted.

But it is precisely in this direction that Prof. Giglioli's weakness lies, with the result that the book is cumbered and inordinately expanded with irrelevant matter, interesting enough, but not really bearing upon the point. For example, all kinds of light waves and ethereal radiations doubtless possess some action upon the living plant, but as these effects are still practically unknown, it is surely superfluous to devote fifty pages to a purely text-book account of phosphorescence and kindred phenomena, including the incandescent properties of the rare earths in the Auer lamp, Crookes's tubes, radiant matter and kathode rays; nor, again, in another section, can we see the appropriateness of a discussion of the skin vision of animals or of Prof. Poulton's experiments on the influence of coloured lights upon the larvæ of *Pieris*.

This is the most unsatisfactory portion of the book, and we cannot help feeling that, in his desire to be exhaustive, Prof. Giglioli has discharged upon us pell-mell all the references he has accumulated, without considering how far they have yet been made to bear upon

his subject. It is true that the man of science who wants to go beneath the surface of things must carry in his mind all sorts of cognate facts and investigations, in the hope that some day they may supply a missing link in his own work, but he should not present the public with this raw material.

The earlier sections of the book, dealing with the relations of the plant to water, are less academic, and contain many interesting references to the author's own experiences of agriculture under the hot suns and small precipitation of Italy. He discusses at some length the development of the root, and refers to this cause the increased power of resisting drought which certain manures, particularly nitrate of soda, give to the crop. In this section, Prof. Giglioli draws freely on the results of the Rothamsted experiments, particularly on Lawes and Gilbert's paper upon the drought of 1870 and its effect upon the variously manured grass plots. This question of the action of manures upon root development is worthy of more study than it has hitherto received, for it seems to afford a clue to the explanation of the greater ease with which a plant manured with nitrate of soda will in some cases obtain its other mineral food from the soil, as compared with one receiving the same amount of nitrogen in the form of ammonium salts.

The earlier chapters of the book have not been brought so closely up to date as the later pages; in the account of the amount of water transpired by plants, we have Lawes and Gilbert's figures, but not the later work of Hellriegel, Wollny, and King of Wisconsin, and again, in the discussion of the value of tillage in conserving soil moisture, no mention is made of the valuable observations which have been accumulated in America on this point.

The reader who is interested in the effect of climate upon crop production will find that Prof. Giglioli deals repeatedly with this most intricate problem. The alteration by climate of English varieties of wheat introduced into Italy is discussed on pp. 187 and 379, a subject of interest at the present time, when efforts are being made to get into English wheats something of the "strong" character of those imported from more arid countries, and again, on p. 189, we have a correlation of the hay crops grown at Rothamsted under various systems of manuring with the rainfall of the months of April, May and June.

On p. 100, we have a reference to Frank's discovery of mycorrhiza, but we have no account of the weighty generalisations contained in the later papers of Frank and of Stahl, which have shown how interesting and widespread a variant of the general course of nutrition is presented by plants with mycorrhiza.

The special value of the book lies in its enthusiasm and breadth of view; we feel we are dealing, not only with a specialist, but also with one who possesses a many-sided knowledge and experience. To an Englishman, it is pleasant to see how references to English work abound; particularly it is clear that Prof. Giglioli has kept himself familiar with the experiments at Rothamsted, where so much of the pioneer work in agricultural science has been done. Prof. Giglioli contrasts Italy unfavourably in the matter of agricultural experiments, but will the English work play so large a part in any treatise of a foreign professor fifty years hence? Rothamsted stands where

it did, the monument of two great men's work, but unconnected with any organisation, either official or educational; other countries have been only too anxious to foster and develop any living starting point they could find.

A. D. H.

A HIMALAYAN LOCAL FLORA.

Flora Simlensis: a Handbook of the Flowering Plants of Simla and the Neighbourhood. By the late Colonel Sir H. Collett, K.C.B., F.L.S. Pp. lxxviii + 652. (Calcutta and Simla: Thacker, Spink and Co.; London: W. Thacker and Co., 1902.)

WHEN, in 1897, Sir Joseph Hooker wrote his preface to the final volume of the "Flora of British India," he gave it as one of the chief uses of his great work that it would "facilitate the compilation of local Indian floras." We believe that since that book began to issue, the handbook before us is the first general local flora that has been prepared for India, though various floras for *forest* purposes only have already appeared. Other general floras, for what are wider areas, are in course of preparation for Bengal, Bombay and the Upper Gangetic Plain; but although these floras will apply to whole provinces, or at any rate to areas as large as provinces, they will, none of them, cover so wide a vertical range, for the late Sir H. Collett's handbook practically treats of plants growing at all altitudes, from the Himalayan valleys only a little raised above sea-level to elevations of 12,000 and even of 16,000 feet. The area taken up is not one of exact geographical limits, but, as the author has said:—

"I have assigned no strictly defined limits to the 'Flora,' believing that this would answer the requirements of students better than if I were to confine it, for instance, to the territorial limits of the Simla Municipality or any other arbitrarily fixed boundaries."

It seems, however, to include every plant which a Simla botanist is likely to meet with in his rambles, and we feel sure that the book will be much appreciated, though we cannot avoid a feeling of great regret that its author has not lived to enjoy the pleasure he looked forward to of knowing that he had done something to help those who are already students of his favourite science, and perhaps to induce more of those Indian officers who want a pursuit to occupy their leisure time, to follow in his footsteps and study the plants of the forests, glens and slopes of the Simla mountains.

It has not been an uncommon thing at Simla to hear the wish expressed that someone would publish a handbook of a not too difficult scientific character, giving the names and descriptions of the chief plants; and, as the author has explained in his preface, it was with the desire of supplying this want that he commenced his work. A careful examination of the book shows that his efforts have been successful. The descriptions are concise and couched in the simplest language; the analyses lead easily to the genus and species required; while the excellent pen and ink drawings prepared by Miss M. Smith, of Kew, will be a great additional help to those who consult the work. These drawings have been judiciously selected, to illustrate, not only the chief genera and species, but also the most common and conspicuous plants to be met with in Simla and its neighbourhood.

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In addition to the characters of the natural orders, genera and species, and to analyses and an account of the geographical distribution of the plants, many useful notes are given which are sure to be of interest. As a sample may be cited the brief account of the method of fertilisation of *Roscoea*, a genus of gingers with purple flowers, where the mechanism by which the anthers are caused to shed their pollen on the backs of the insects which visit them is shown to be similar to that of the quite different genus *Salvia* in Labiatae. The derivations of the generic names have been duly explained, and wherever it has seemed of interest, reference has been made to such books as Darwin's "Origin of Species," Fritz Müller's "Fertilisation of Flowers" and Kerner's "Natural History of Plants." It is clear that Sir Henry Collett took the greatest pains to make his book as useful as possible, and it is well that the pioneer of Indian local floras will be such an excellent model for future work of the kind. To the author, as every page of his book shows, his work must indeed have been a labour of love. It will be useful to residents and visitors, not only in Simla, but in the other hill resorts in the Punjab, while even in the more easterly ones—Chakrata, Mussooree, Nainital—where the flora is richer, the book will be of considerable help to those interested in plants.

Besides Sir H. Collett's own preface, the descriptive portion of the work is preceded by an "In Memoriam" notice of the author by Sir W. T. Thiselton-Dyer, K.C.M.G., F.R.S., the Director of Kew, and by an "Introduction" by Mr. W. B. Hemsley, F.R.S., the curator of the herbarium at the Royal Gardens. In his notice, Sir W. T. Thiselton-Dyer gives a brief account of the life of the author, who, during a long and distinguished career as a soldier, studied science, and especially botany, in his leisure moments, and after his retirement in 1893 commenced the present work, which he only just lived to complete. Sir William finishes his notice by saying:—

"No one who has ever come to work among us at Kew has more completely won the affectionate regard of everyone with whom he has come in contact."

In his "Introduction," Mr. Hemsley gives a brief account of the geography of Simla, of its vegetation and of the chief botanists whose collections have been utilised in the preparation of the handbook. Some idea of the extent of the flora of the small Himalayan area to which it refers is obtainable from the fact that the handbook describes no less than 1326 species belonging to 639 genera and 113 natural orders.

We may conclude this brief account of a noteworthy botanical handbook with the following extract from the address of the president at the anniversary meeting of the Linnean Society on May 24 last:—

"In Sir Henry Collett we lose an accomplished botanist who was also a gallant soldier and a capable administrator, a combination of qualities that seems to be peculiarly British. It would not be easy to estimate how much this Society, and other kindred societies, owe to the public services, and more particularly the Indian, for the invaluable recruits whom we continually draw from their ranks."

We can hope that the "Flora Simlensis" will prove as enduring a memorial of its author as the record of his achievements, military and administrative, is likely to be in the history of the Indian Empire.

J. S. G.